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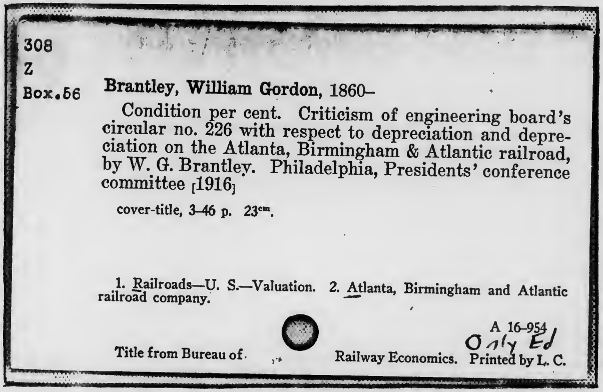

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CONDITION PER CENT.

CRITICISM OF ENGINEERING BOARD'S CIRCULAR No. 226 WITH RESPECT TO DEPRECIATION

AND

DEPRECIATION ON THE ATLANTA, BIRMINGHAM & ATLANTIC RAILROAD

BY

W. G. BRANTLEY

OFFICE OF
GENERAL SECRETARY
PRESIDENTS' CONFERENCE COMMITTEE
PHILADELPHIA, PA.

m B A. June 26, '17

June 19, 1916.

CONDITION PER CENT.—CRITICISM OF ENGINEERING BOARD'S CIRCULAR No. 226 WITH RESPECT TO DEPRECIATION

BY

W. G. BRANTLEY

This circular provides arbitrary rules for determining the monetary value in their used condition of the various plant units of a railroad property separately considered. The loss in monetary value because of use and age, determined by arbitrary rules and not by reference to the market price, is found to be depreciation. The cost of reproduction less depreciation, stated in dollars, is the estimate of the monetary value on date of valuation of each plant unit in its then condition. The method of calculation is to assume a normal service life for each unit, and then to estimate the length of such service life that has been consumed on valuation date. The ratio between the remaining service life and the total assumed normal service life is made the condition per cent. of the unit, and this condition per cent. applied to the cost new of the unit, under the straight-line method, determines its cost of reproduction less depreciation.

The purpose of the circular is made clear by the following quotations therefrom:

> "Depreciation is the lessening in worth of physical property due to use or other causes."
>
> "Labor depreciates with the items of property of which it is a part."
>
> "Service condition per cent. is the ratio between remaining capacity for service and total capacity for service in each cycle of use."
>
> "Depreciation shall be determined by a consideration of observations of actual conditions of the property and mortality statistics of similar property in like use applied where practicable on the straight-line basis."

> "Normal life shall be the estimated average total service life under ordinary conditions."
>
> "Ordinarily, service condition per cent. shall be the ratio between the remaining service life and the total service life. When the depreciation of an item of property is based upon the weighted average of the parts, the service condition of each part shall be determined by this ratio."
>
> "When a normal life for a particular item of property has been prescribed for use in determining depreciation, that life must not be departed from unless an investigation of the records of the carrier or actual inspection in the field or the two combined warrant such departure. In no case shall a remaining service life of an item of property be taken at more than the prescribed normal life."
>
> "When no normal life is prescribed, the total service life and remaining service life shall be determined from observations of actual conditions and the examination of records and data from reliable sources."

In practice great latitude is allowed the field forces in applying the rules set forth in the circular.

In the introduction to the engineering report on the Texas Midland it is said that:

> "Excepting as may be subsequently pointed out the service condition per cent. of the property of the Texas Midland was determined in accordance with the principles and rules set forth in the Engineering Board's Memorandum to the Director No. 226."

It also appears in this introduction, with reference to station and office buildings, under Account No. 16, that:

> "It was found that had mortality tables been available, their exclusive use would not have been satisfactory because of instances where buildings being permitted to rapidly deteriorate and receiving no maintenance, the mortality table would give a much higher service condition than the facts warrant."

In the introduction to the A., B. & A. engineering report it is said:

> "General depreciation was estimated as instructed in Memorandum of the Engineering Board No. 226 as revised November 6, 1915, the total service life allowed being the maximum given in that memorandum, but modified in specific cases where field inspection indicated that modification should be made. The instructions contained in the memorandum were departed from with such variations and details as are indicated below."

In the introduction to the Norfolk Southern Engineering Report it is said:

> "Depreciation is estimated in accordance with memorandum of the engineering board dated November 6, 1915. Total service life allowed is the maximum given in that memorandum, modified in accordance with conditions observed at time of field inspection. In some cases it was found necessary to depart from the instructions contained in Memorandum No. 226."

The Director in commenting upon Circular No. 226 has stated, in substance, that the straight-line method is not rigidly followed, and that the representatives of the Government are permitted, when the condition of the items of the property seem to justify it, to assign a remaining life, which if added to expired life would produce a higher figure than the supposed total useful life, but that the remaining service life allowed may never exceed the total service life as prescribed.

These several modifications in practice of Circular No. 226 are not a modification of the assumption that the estimated service life exhausted in a plant unit measures the depreciation in it, nor do they indicate any modification of the principle that the monetary value of the plant units in their used condition is the end sought to be ascertained.

The effect of the modifications permitted is to leave service life lost as the measure of the depreciation, but to destroy any rule by which the same shall be determined, and to leave such determination to the arbitrary opinion or judgment of the man who actually inspects the plant unit. Any exception, therefore, to a conclusion reached by him, as to the condition per cent. of a plant unit, cannot be based upon the ground that a rule has been departed from, for the effect of the modifications permitted having destroyed the rule there is no rule by which to check the conclusions reached. It follows that an exception to a conclusion reached must be based upon opinion also, and this means that upon the hearing of such exception the issue will be simply one opinion against another opinion.

The fundamental and controlling question first to be considered, in passing upon Circular No. 226, is whether or not the depreciation in the plant units of a railroad property can properly be determined by comparing their cost new with their monetary value in used or worn condition on the date of valuation. It would seem that if this is the proper method of determining depreciation, that proper rules for estimating the loss of service life of the various plant units, and for determining the probable dates of their renewals or the renewals of their parts might be agreed upon. Exception is now made, not so much to the rules set forth in the circular, as to the basic principle upon which they rest, for it is not believed that the monetary value separately considered of the worn plant units of a railroad, in place and being maintained with full capacity for service, is a factor to be considered in ascertaining the cost of reproduction less depreciation of such units.

Without now attempting any complete discussion of depreciation, the attempt will be made to point out specific and controlling objections to the use of the loss in monetary value, because of age and use, of the plant units of a railroad, as the measure of the depreciation in such plant units.

1. The investment in road and equipment required by the Commission to be shown in the carriers' accounts is designed to show the investment of the carrier in property devoted to transportation service. The valuation of the physical properties of a carrier is presumably designed, in part at least, to disclose the correctness or incorrectness of its investment account, but clearly such valuation will not do this if the purpose of the investment, and the character of the value sought and obtained thereby, is ignored and another or different standard of value set up.

2. The plant units of a railroad are acquired for use and not for sale. They are acquired and put in place in order that a certain service may be performed by their combination and use. The value of the investment is measured by the service that the combination of the various plant units in use can render, and so long as this service continues complete for the purposes desired there is no loss in worth of the investment, and, hence, no depreciation.

3. Each plant unit in place has a value, aside from and in addition to its cost, by reason of its combinations with other units. Its scrap or used value as an isolated unit is one thing, and its value in place as part of a complete whole is quite another thing. It is not for sale and there is no warrant, therefore, for estimating its monetary value in its used condition as an isolated unit. Its monetary value, if same is sought to be determined, must be determined of it in place, and not as an isolated unit, and must be determined by the measure of its earnings or what it produces for its owner. This is its true monetary value. The law requires the ascertainment of its cost of reproduction less depreciation, and not its monetary value as an isolated worn unit. Under the requirement of the law there must be ascertained the cost to reproduce it new, and also the extent, if any, by which its capacity for service in place has been decreased because of its use or age. It cannot suffer a decrease in value for the uses and purposes intended, save as its capacity for service decreases.

4. To say that "depreciation is the lessening in worth of physical property due to use or other causes" means, and is construed by the Government field forces to mean, a lessening in monetary or sales value due to use or other causes. There may be a "lessening in worth" for sales purposes due to a change in the market price, but no one contends that this is the depreciation involved, although it is a "lessening in worth" due to "other causes" than "use." There is no more reason for claiming that a "lessening in worth of physical property due to

use" is depreciation, where full capacity for service exists, than there is for claiming that a "lessening in worth" due to a change in market price is depreciation. This is made evident by the fact that a very slight use of a physical property will seriously affect its sales value, although not affecting in the slightest its capacity for service. A new tie put in the track and immediately taken out loses in market value because of its mutilation, and yet if allowed to remain in place it has all the value to its owner of a new tie. The Supreme Court in the Backus Case said that the "true cash value" of a property is the value "which it has as used and by reason of its use." In other words, the "true cash value" of a tie in place in a railroad track, is the value "which it has as used and by reason of its use," and not the price it would bring in the market as a second-hand or used tie. Cost of reproduction less depreciation may therefore be substantially defined as the cost of reproduction of physical property diminished by its loss of capacity for service, or its loss in worth for the uses and purposes intended, due to use or other causes.

5. Circular No. 226 ignores the economic fact that a railroad property is a continuing property and that its service life is indefinite. The circular undertakes to obtain what is called "service condition per cent." of each unit by ascertaining "the ratio between remaining capacity for service and total capacity for service in each cycle of use." This overlooks the fact that there must be a continuous "capacity for service," and that so long as same is continued full and complete, the whole purpose, and as well the whole value of the investment in the unit is preserved. It is not a question of how long a particular tie will last, but with respect thereto the sole question is, does the carrier keep constantly and continually in place a suitable tie? "Capacity for service" exists in one tie as well as in another, and so long as a tie is there, and in place, with "capacity for service," the element of depreciation cannot enter.

6. Circular No. 226 ignores the basic principle upon which the Commission's accounting regulations are framed, and that is that where a railroad property is properly maintained, the "capacity for service" of each plant unit is assumed to continue until such plant unit is replaced. These regulations

provide that the replacing of a worn plant unit by a new plant unit of like kind does not authorize any increase in the investment or capital account of the carrier, and this because "capacity for service" in the plant unit must continue, and so long as it does continue with such unit in place, there is no depreciation; and because when the time for replacement arrives and the replacement is made, the depreciation then developing is at once overcome, so that no loss in value occurring up to the time of replacement, and that then occurring being promptly overcome, there is neither decrease nor increase in the investment or capital account of the carrier.

7. Circular No. 226 is seemingly based upon the assumption that an implied contract exists with the State upon the part of the carrier to always maintain in place new plant units of every description, and that to the extent of its failure so to do its property is depreciated. This assumption is not justifiable, for the true obligation of the carrier to the State is to always have in place, by proper replacements, not new plant units, but plant units with full "capacity for service." So long as it does this, it complies with its contract and fully preserves its investment, and there is no depreciation in its property.

8. Circular No. 226 overlooks the right of the carrier to always replace its worn plant units with new plant units as needed, at a cost chargeable to the expense of operating the property. The Supreme Court conclusively established this right in the Knoxville Water Company Case, 212 U. S., 1, when the Court said:

> "Before coming to the question of profit at all the company is entitled to earn a sufficient sum annually to provide not only for current repairs, but for making good the depreciation and replacing the parts of the property when they come to the end of their life. * * * It is entitled to see that from earnings the value of the property invested is kept unimpaired so that at the end of any given term of years the original investment remains as it was at the beginning."

Circular No. 226 seemingly admits that the cost of ordinary repairs is chargeable to operating expenses and is, therefore, not depreciation, but fails to recognize that replacements are but a form of repairs, and that their cost is on the same footing as all repairs. A railroad property cannot be maintained and its full "capacity for service" continued, except by a constant and continuous replacement of its various plant units. The thing sought is not a continuous condition of newness for each plant unit, but is a continuous condition of full and complete "capacity for service." A plant unit with its "full capacity for service" existing at the date of valuation, cannot be said to be depreciated because its "capacity for service" will expire two, four, eight or twenty years hence. Its "full capacity for service" existing on valuation date, there is no depreciation then existing, and the fact being that whenever its "capacity for service" ends, the carrier will not be called upon to make any new investment of capital in order to obtain a new plant unit to take its place, but may charge the cost of same to operating expenses, such future depreciation cannot affect the value of the investment on the date of valuation.

9. Circular No. 226 is based upon the assumption that the railroad is to be dismantled as of the date of valuation, and therefore that there must be ascertained as of that date the then monetary value, in used condition, of each of its plant units, whereas the fact is that the railroad is a continuing property and its cost of reproduction as such should be ascertained. All renewals and replacements of its plant units are but a cost of its operation and require no investment of new capital. It follows that so long as such renewals and replacements are made as due, thereby continuing "full capacity for service" there cannot be any depreciation in the property.

10. Circular No. 226 assumes without justification that the normal natural condition of a railroad is one of absolute newness of each and every plant unit, and that the extent of departure because of age or use from such newness by each plant unit, is the depreciation or loss in its worth to be considered in determining its cost of reproduction less depreciation.

11. Circular No. 226 provides no method for ascertaining the cost of reproduction less depreciation of the plant units, for the method proposed is incapable of practical application, and no method is provided for determining loss in "capacity for service." A railroad of any considerable size cannot be completed and put in operation without having its various plant units of different ages and in varying conditions of use. The promoters of the property never designed to have them in any other condition after being put in place. The property cannot actually be reproduced in any other condition, and yet this fact is wholly ignored by Circular No. 226. This circular is based upon theories and speculations that will not stand the test of practical application. To assume that the cost of reproduction less depreciation of a railroad is measured by the monetary value of its worn plant units is, aside from all other consideration, to provide a measure wholly incapable of practical application. This is true because there could not be found in the markets of the country sufficient worn plant units with which to build and construct the railroads of the country. The railroads of the country could not be reproduced except with new plant units. Take the ties alone on one of the great railroad systems, and where would anyone find the millions of second-hand ties with which to construct it? Such ties simply do not exist, and if the railroad is to be reproduced it must be reproduced with new ties.

12. Circular No. 226 ignores entirely the element of "going concern" value which must, in part at least, be considered in ascertaining the cost of reproducing the property.

In the Des Moines Gas Case, reported in 238 U. S., 165, the court held that "there is an element of value in an assembled and established plant doing business and earning money over one not thus advanced," and that "this element of value is a property right and should be considered in determining the value of the property upon which the owner has a right to make a fair return." The court further held that this element of value might be sufficiently allowed for by determining the value of the plant "upon the basis of a plant in successful operation."

"Going concern" value being declared by the Supreme Court to be a "property right," it would be a complete denial of its existence to deduct from the "cost new" of its plant units, as depreciation, the value of an estimated loss of length of service life, there being no loss in "capacity for service." A part of the essence of "going concern" value is that it protects the owner against any loss in value of his property by reason of the loss of length of service life of the plant units composing it. This protection is afforded by the "right," to charge the cost of renewals to operation. This "right," recognized in the Knoxville Water Company Case, in the case of a public utility, exists because the property is a public utility, and is an assembled operating property, whose value must be ascertained "upon the basis of a plant in successful operation." Why should a carrier in successful operation sell one of its used plant units which is in use, with its full "capacity for service" continuing in it, for less than its cost new? The carrier knows that it must be allowed to earn on the cost new of its plant unit until its service life expires, if it is to be saved from bankruptcy. The carrier also knows that when such service life expires it will be entitled "out of earnings," and as a part of the "cost of operation," to buy a new piece of property of similar type and continue to earn on the cost new of the original unit.

Why should a proposed purchaser of a railroad "in successful operation" have any regard, in determining the price he will pay, to the fact that the various plant units of such railroad are in "used" condition and "partly worn" so long as they maintain their "full capacity for service?" He knows that so long as its "full capacity for service" continues he can earn just as much money out of a "used" plant unit as out of a new one, for the service rendered will be the same, and he also knows that when the service life of the plant unit expires he will not have to make any investment of new capital in order to obtain a new one, but will be entitled to obtain same as a part of the "cost of operation."

In order to give recognition, therefore, to "going concern" value in this regard, there must be recognized the value of the "right" of the carrier to earn the "cost of repairs and replacements" as a part of the cost of operating the property, and such recognition will require that in determining the cost of reproduction less depreciation of a railroad property, there can be no deduction from cost new of a plant unit, with "full capacity for service" existing, of its estimated loss of service life, for the value of such estimated loss is completely offset by "going concern" value. There can be no such thing as a comparison between the cost new of a plant unit, with "full capacity for service" existing, and its second-hand monetary value, for the purpose of determining the depreciation in it, because the difference found is offset by "going concern" value. If the element of "going concern" value is to be allowed at all, the only depreciation that can be found will be that resulting from a loss in "capacity for service," due to a failure on the part of the carrier to make needed repairs and replacements when due.

13. To say that a tie is worth 56 cents new because it is in place in the track, while it would only have value for fire wood or scrap, if out in the forest, is not to allow anything for the element of "going concern" value. The price of 56 cents is fixed presumably because that chances to be the market price of a new tie for railroad purposes, and could not be fixed at anything less than this without making the valuation an absurdity. To contend, however, that fixing the price of a new tie at 56 cents, instead of fixing its value as scrap or for fire wood purposes, does make an allowance for "going concern" value, is to admit that the element of "going concern" must be considered; and once it is admitted that this element of value must be considered, there is no warrant for arbitrarily limiting its effect or influence. If it is sufficient to lift the value of a new tie from scrap value to its cost new because the tie is in place in the track, it is sufficient to lift a worn tie that is in place, not simply to some percentage of its cost new, but to its full cost new. That it is sufficient for this purpose is conclusively shown by the simple fact of the legal right of the carrier to replace the old tie with a new one as a mere cost of operation.

14. Circular No. 226 confuses depreciation accounting with actual depreciation. The Supreme Court declared in the Minnesota Rate Cases that it is only the "actual existing depreciation" on the date of valuation that should be considered. A plant unit with its full "capacity for service" existing on valuation day has no "actual existing depreciation"

in it at that time resulting from the fact that at some day in the future its entire "capacity for service" will cease. There can be no depreciation where there is full "capacity for service," and whether such "capacity for service" will continue one, five or ten years longer is wholly irrelevant in the matter of determining existing depreciation. With the right existing on the part of the carrier, whenever such "capacity for service" does end, to replace the old plant unit with a new one, as a mere cost of operating the property, there can be no consideration of an estimated future depreciation. The length of service life of a plant unit or of one of its parts, actual or estimated, is only material for consideration in the fixing of a proper depreciation or replacement reserve. Length of service life is wholly immaterial in the determination of "actual existing depreciation," because it is "service" and not "service life" that is here involved.

15. Circular No. 226 confuses the depreciation accruing in plants like water companies, which can only be overcome at long intervals and at a cost which cannot ordinarily be cared for by a simple charge to operation, with the deterioration in a railroad property which is daily overcome as required, and overcome as a simple cost of operation. It may well be that in the case of a large and expensive pump used by a water company, that a reserve fund should be accumulated with which to replace it when its service life, by reason of its inadequacy, is finally ended. It may well be also that long stretches of water mains laid at one time will have their service life expire at one time, and that the cost of replacing them, as in the case of the pump, would be greater than could be paid for as an ordinary operating expense. In such case it would be proper to have a depreciation reserve also, and in both these cases it might well be that on any given date, by reason of a recognized approaching day for a renewal, that neither of these properties could be given its cost new value. In the case of a railroad, however, its parts are being so constantly renewed, that it is found simpler and more practical to charge the cost of such renewals directly to operation. The vital thing in both cases is to continue the service and at the same time to preserve the value of the investment for service giving. If a continuous service is preserved, and can be indefinitely preserved by the railroad through its method of replacements, it follows that there is no loss of worth in its investment by reason of the age of its plant units.

16. Circular No. 226 is based upon the impossible assumption that there exists or can be ascertained a normal service life of a composite railroad property. There is no composite railroad property, whether it be a station building, bridge, water station, fuel station, track or equipment, whose service life, barring its accidental destruction, cannot be maintained indefinitely. As matter of fact the service life of these properties is maintained indefinitely, so far as destruction from "use" is concerned, and only ends in railroad practice by reason of obsolescence or inadequacy. Station buildings become too small or otherwise inadequate and are replaced. Bridges become too light for the increased weight of traffic and are replaced. Rails become too light for the same reason and are replaced. Larger, more modern and more economical equipment is required, and old equipment is retired. In all these cases the replacement is for the purpose of increasing the service, or of rendering it more economically. The replacement involves no suggestion of loss of "capacity for service." Because such replacements have been made in the past, and a length of service life thereby fixed for the plant units replaced, affords no basis for any assumption that the same conditions will exist in the future, or that the length of service life of a plant unit in the past will be the length of service life of a substitute unit in the future. To estimate a length of service life of a composite property is to indulge in pure speculation, and there can be no justification for destroying value by speculation. Any assumption of a normal service life of a composite property is and must be purely arbitrary, and its use cannot be justified in the determination of the present value of the property or its cost of reproduction. Such an arbitrary assumption may be used as a basis for fixing a proper depreciation or replacement allowance, and when used for this purpose any error made in giving a too long or a too short life can be corrected. There is no way to correct an erroneous assumption where same is used to determine present value or cost of reproduction.

17. Circular No. 226 in dealing with equipment seemingly recognizes the impossibility of determining upon a normal length of service life for such property. It provides that:

> "The present service condition of each locomotive shall be the weighted average of the assigned condition per cent. of the following principal parts:
> Engine: (*a*) Boiler; (*b*) Underframe; (*c*) Running Gear.
> Tender: (*a*) Trucks; (*b*) Underframe; (*c*) Tank."

The same method of treatment is applied to freight-train cars and passenger-train cars and it is provided that:

> "The service condition per cent. established for each car inspected shall be the weighted average of the service condition per cent. assigned to the following principal parts of the car: (*a*) Body; (*b*) Underframe, and (*c*) Trucks."

This method of using the weighted average of the condition per cent. of the parts of a piece of equipment, while presumably resorted to because of the recognized impossibility of fixing a normal length of service life for it, results actually in the fixing of a normal service life, and the per cent. condition arrived at is in fact a percentage of an estimated service life. The result reached finally is nothing more than the estimated second-hand monetary value of the piece of equipment, arrived at by deducting from its cost new the estimated value of the service life that has been lost, and this wholly regardless of the fact that on valuation date the piece of equipment may possess its "full capacity for service."

In the introduction to the engineering report on the A., B & A. there is an admission that an assumed future obsolescence of equipment is used to fix the service life of equipment, and that the life of each of the parts of a piece of equipment is limited by this assumption. No such admission appears in the engineering report on the Norfolk Southern or the Texas Midland.

It is said in the A., B. & A. engineering report that:

> "All rolling equipment was depreciated in accordance with the field inspection of the parts, this inspection taking account of obsolescence of the entire unit by limiting the life of all parts to the period which would elapse before the unit was expected to go out of service."

There can be no justification for destroying value by a guess as to when future obsolescence will occur. Because a locomotive or a car of a certain type became obsolete or inadequate within a certain number of years in the past history of a railroad, furnishes no basis for the assumption that the present type of locomotive or car in use will also become obsolete or inadequate within the same period of time. Where a locomotive or a car in use possesses its full "capacity for service," and by proper repairs and renewals of its parts can be made to continue indefinitely such full "capacity for service," there is no justification for destroying any of its cost new value because of the guess of some one that at some date in the future it will be retired from service by reason of obsolescence or inadequacy.

18. The weighted average method set forth in Circular No. 226, if the records of replacements of the carrier being valued are used, will result in a shorter length of service life for the various parts of equipment in a highly prosperous road, and a consequently less cost of reproduction less depreciation of such parts, than will be given to the less prosperous road. This result will be reached because of the fact that the more extensively and continuously equipment is used, the shorter the service life of its parts, and the more rapidly they wear out and have to be replaced.

The rule in Circular No. 226 as applied to equipment will produce very inconsistent and absurd results, because in every case the condition per cent. of any piece of equipment arrived at by the weighted average method will depend upon the date of the valuation. This is illustrated in an actual case of one of the railroads where the complete boiler in a locomotive was assigned a normal life of 18 years, and 44 per cent. of the total cost of the locomotive. It is perfectly manifest that if this particular locomotive chances to be valued at a time when the boiler is some 16 or 17 years old it will be given a very much lower value than can be given it at the age of 19 or 20 years, or just after the time that a new boiler has been put in place. What is true of the boiler is true of all the other parts of a locomotive, and thus with a uniform "capacity for service" always existing in a locomotive, and with the investment therein under the Commission's regulations remaining the same, the theoretical methods of Circular No. 226, while always producing a less figure than the investment or cost new, will produce varying figures dependent upon the date of valuation.

The application of Circular No. 226 to equipment, in addition to producing inconsistent results, will produce on the average for all the railroads a present value of equipment of about 50 per cent. of cost new, and the shorter the normal service life fixed, the earlier will a 50 per cent. condition for any road be reached.

The methods of the circular naturally and logically produce a condition of 50 per cent. for ties, where tie renewals are regular and normal. They would undoubtedly produce the same 50 per cent. condition of all the boilers on a railroad, if the boilers were grouped together as one class in the same way that ties are grouped; provided, of course, that the railroad has been in existence long enough for the renewal of boilers to become regular. They would give the same 50 per cent. condition, and for the same reason, and in the same way, to the running gear, and the engine frame, if each of these parts of the locomotives were grouped together as one class in the way that ties are.

The only reason that a locomotive as a whole may be given a higher condition than 50 per cent. is that it is treated as a composite property, the parts of which have different lengths of life and different values, and because a weighted average is used. A careful examination, however, will disclose that even under the weighted average method, while the condition per cent. figure of a locomotive will vary from year to year as its different parts are renewed, its condition will average throughout a long series of years substantially 50 per cent. condition.

To assume a normal life of 18 years for the boiler in a locomotive, and then to find that because the boiler is nine years old on valuation day, that it is only in 50 per cent. condition, and has but 50 per cent. of its cost new remaining, is to assume without warrant or justification that the locomotive containing this boiler is to be taken out of service on valuation day, requiring the ascertainment of the second-hand monetary value of its several parts on that date; and it is to assume, also without warrant or justification, that the locomotive is not to receive a new boiler at the expiration of nine years, as a mere cost of operating the railroad, and be continued in service.

There can be no claim that the boiler at nine years of age does not possess its full "capacity for service." There can be no obligation upon the part of the carrier, either to itself or to the public, to do more than keep in place with full "capacity for service" either that boiler or a substitute for it. Circular No. 226 ignores entirely that this is the only specific obligation existing, and as well ignores the right of the carrier to keep this obligation by charging to its earnings, as a part of the operating expenses of the property, the cost of a new boiler.

19. The right of the carrier to charge the cost of repairs and replacements to operation cannot be, and is not, in practice, preserved as to the greater part of its plant units, by so-called depreciation or replacement reserves. A railroad property with its thousands of plant units is so constructed as to make it a comparatively simple matter to replace them constantly and continuously as is required. The actual practice of the railroads to so replace them as a mere cost of operation is fully recognized by the Commission as a proper practice. Mr. Commissioner Lane in the Western Advance Rate Case, speaking for the Commission, said:

> "It is to be borne in mind that it has been American railroad policy to maintain the property fully"—not merely to maintain it but to maintain it fully—"in a constantly improved condition both as to road bed and equipment out of current revenue" (not out of depreciation reserves).

He also said in this case that:

> "The maintenance accounts (not the depreciation reserves) of these carriers practically rebuild the roads every ten years."

The duty of the carrier is to maintain its property so that it will continue to have its full "capacity for service." It cannot be so maintained except by the making of constant repairs, renewals and replacements, all of which are a cost of operation. So long as it does so maintain its property there is not, nor can there be, any depreciation in it, or loss in value of the investment therein. So long as the property is so maintained it is wholly immaterial whether this maintenance is had by direct charges to operation, or by a charge first to operation, followed by a credit to depreciation reserves and later a charge to such reserves. The property must be maintained, and its full "capacity for service" continued whether or not there exists any depreciation reserve. A property that is allowed to run down and to lose a part of its full "capacity for service" is depreciated, regardless of the size of its depreciation reserve. On the other hand if the full "capacity for service" of the property is continued by means of proper renewals and replacements there is no depreciation in it, even though it has no such reserve.

20. In the practice of the railroads depreciation reserves with respect to equipment are designed to cover actual retirements only, which retirements are in the main due to obsolescence and inadequacy. They reflect nothing at any time as to the service condition of the equipment as affected by use. It is universally recognized that it is more economical to a railroad company to rebuild old equipment, thereby utilizing its available parts which are of value, that it is to buy or build entirely new equipment of the same type. The carriers do not replace old equipment with new equipment of like character, but when replacements are made, they are made because equipment of a different type has become desirable.

Inquiry has been made of a number of carriers to report any cases where they have destroyed or scrapped old equipment on account of being worn out, and replaced same with equipment of identically the same class and design, instead of repairing the old equipment, and all the railroads replying have said that there has never been such a case occurring with them.

As illustrating the function of a depreciation or replacement reserve in the case of equipment, and showing its non-relation to deterioration arising from use, it may be said that on the Norfolk & Western Railway its records show that its actual expenditures on equipment between 1910 and 1915, inclusive, equaled in amount more than the total value of its equipment in 1910, or in other words that the actual expenditures for repairs and renewals of parts amounted each year to over 16 per cent. of the cost new of the equipment. This is exclusive of the allowance for depreciation due to obsolescence and inadequacy, which is but a fraction of this amount.

An examination of the records will disclose that during the years 1914 and 1915 the Norfolk & Western averaged an expenditure of about $2790 per year on each of its locomotives. The Chesapeake & Ohio Railroad for the year ending June 30, 1915, spent $2890. The Union Pacific Railway $3055, the Pennsylvania Lines East $3510, the Denver & Rio Grande $2442, the Soo Line (of lighter grade) $2102. These amounts were expended for maintenance in the making of repairs and renewals of parts and were charged directly to operation. The small amount credited to the depreciation reserve was in addition to these expenditures.

On the Missouri Pacific Railroad a locomotive which originally cost $8350 was taken out of service after actual use of 43 years. During that period the average annual cost of all repairs to this locomotive was $3227 and there was spent thereon during its whole life $138,761. A correct depreciation reserve to have covered the actual service life of this locomotive, in case one had been established, would have amounted to only $163 per year. At an actual service life of 38 years another locomotive on this road which cost $7500 new, had spent on it in the way of repairs and renewals of parts a total of $111,644. If a depreciation reserve had been established on this locomotive to have covered its actual service life it would have amounted to less than $165 per year. Both these locomotives were taken out of service solely on account of inadequacy. They could have been continued in service indefinitely.

The cost of renewals and replacements of parts of locomotives and other equipment, owing to different densities of traffic, varies on different roads, and on the same road.

It is a cost just as unrelated to the value of the equipment, or to the investment of the carrier therein, as is the cost of fuel and labor with which to operate the equipment. It is a cost incurred in order that "full capacity for service" may be continued, and it is only when it is not incurred as needed, resulting in decreased "capacity for service," that the element of depreciation or loss of worth enters.

21. Circular No. 226 provides that "labor depreciates with the items of property of which it is a part." This provision is in entire consonance with the general scheme of the circular to obtain the second-hand monetary value of the plant units. If the material for a unit of property costs $30, and the labor, interest and overhead costs to put the material together amounts to $70, the total cost of the unit and its reproduction cost is $100. If the unit becomes completely deteriorated and has to be retired the loss is $100. If it is to be sold in used or worn condition, it will bring only some percentage of its cost new value, which of course means a percentage only of the labor cost attaching to its construction.

To determine the cost of reproduction less depreciation, however, of a maintained property unit, the same being in place as part of a railroad, by any such method is wholly erroneous. The property unit being in place is not to be sold, but is to be maintained at its "full capacity for service," and this means that all original labor costs lost by reason of deterioration must be and are replaced by new labor costs in supplying maintenance, so that the full quantum of labor cost new is always in the property. These additional labor costs are but a part of the cost of operation and do not authorize an increase of capital investment. They fully offset, however, all labor costs lost by deterioration, and as there can be no increase of capital investment by reason of the maintenance labor costs, there should be no deduction for the labor costs lost. There can be no justification for depreciating labor costs in any maintained property.

22. Circular No. 226 makes no provision for depreciating engineering, and in the reports on the A., B. & A. and the Norfolk Southern this item is not depreciated. It is depreciated, however, in the Texas Midland report, and this undoubtedly should be corrected.

In Circular No. 226 it is said with respect to engineering that: "In view of the fact that the larger portion is expended on location surveys, grading and other property which does not depreciate, etc." This admits that as regards engineering, the railroad is a continuing property with an indefinite service life. This admission disposes of the whole theory of depreciation as set forth in the circular, for if the railroad is a continuing property with respect to engineering costs, it is the same with respect to all other costs of construction. If, upon the other hand, it is assumed that the railroad is to be dismantled and the second-hand monetary value of its various plant units separately ascertained, as the circular assumes with respect to all costs other than engineering, the engineering cost would depreciate one hundred per cent., for in no disposition separately of the plant units could anything be realized for engineering.

The railroad being a continuing property the engineering cost is always in the property and does not depreciate. It is equally true that where the railroad is maintained all other costs, whether for labor or material, likewise remain in it, for as fast as a labor or material cost is lost, it is replaced.

23. Circular No. 226 ignores the basic and elementary fact that a railroad property is constructed for service, and that there is no loss of its worth or of the investment in it so long as it is maintained at its "full capacity for service" for the uses and purposes intended. There may be depreciation in it due to neglect, or to failure to supply maintenance in the way of repairs or replacements as needed, whereby there results a loss in "capacity for service." The circular makes no provision for ascertaining this real depreciation whereby the cost of reproduction less depreciation of the property may be made known. It simply proposes methods for applying a theory based upon impossible assumptions, whereby the value of the carrier's investment will be arbitrarily written down, and this without reference to what may be the real depreciation in the property, or to its capacity for service. Maintenance may be withheld purposely or through neglect, but in either event, if same results in a loss of "capacity for service," there is depreciation. A carrier may conclude that a certain structure, such as a station building, or a bridge, should shortly be retired and a new structure substituted

for it, and for that reason may withhold the full maintenance ordinarily given. It may do the same thing and for the same reason with respect to pieces of equipment and other properties. Such properties in these cases become depreciated, and purposely so. This condition is what the Court had in mind in the Minnesota Rate Cases, when the Court said, "It would seem to be inevitable that in many parts of the plant there should be such depreciation, as for example in old structures and equipment remaining on hand."

Old structures and equipment remaining on hand, and not fully maintained because of intention to retire them, do not possess "full capacity for service" and are depreciated. Structures and equipment and other properties which are fully maintained and which possess their "full capacity for service" are not depreciated, and their age is not a factor for consideration. If it was, the Supreme Court would have said that "It would seem to be inevitable that in all parts of the plant there should be such depreciation," because but few, if any, of the parts of the plant are new, and if age depreciates, they are all depreciated.

24. Circular No. 226 assumes a normal service life for various properties, as 70 years for metal bridges "provided that loads for which they were designed are not now being exceeded":

100 years for cast-iron culverts,
80 years for cast-iron culvert pipes,
30 years for other iron or steel pipe,
50 years for vitrified and concrete culvert pipe,
100 years for masonry piers and abutments,
50 years for timber structures, station buildings, etc., and
100 years for masonry structures.

(These two assumptions to be "suitably modified where observation shows principal parts are new or in need of renewal.")

50 years for iron wire,
100 years for copper wire.

These figures are purely arbitrary and great latitude is allowed the field parties in their application, the only limitation being that "in no case shall a remaining service life of an item of property be taken at more than the prescribed normal life."

While the circular prescribes no normal life for rail and certain other properties, the field parties are permitted to do so and to depreciate accordingly.

If the theory of the circular that the age of a plant unit in a railroad determines the depreciation in it shall be finally sustained, the determination of such age will be a matter of some importance. The carriers insist at this time that depreciation cannot be determined in that way. They insist that length of service life of all structures and other composite properties depends upon the character and regularity of the maintenance, and that the life of these properties can by maintenance be preserved indefinitely. They insist that not only can this be done but that it is actually done, and that barring accidents, the service life of such properties comes to an end, as a rule, solely by reason of obsolescence or inadequacy. Age need never cause the end of service life of such properties.

The carriers appreciate that under the methods of Circular No. 226 any arbitrarily prescribed normal life, whether long or short, will in the course of time, renewals becoming regular, produce a condition per cent. of about 50, but they also appreciate the fact that the shorter the normal life prescribed, the quicker will the 50 per cent. condition be reached.

There are materials which in their experience are practically indestructible, and in their experience there are very many instances of destructible properties having a much longer service life than is allowed by the circular. For these several reasons, if the methods of the circular shall finally be adopted, they think there should be substantial changes made in certain of the normal life periods used in the circular, and they will be glad to furnish this experience in support of their views.

25. The carriers object as heretofore to the use of the straight-line method for determining depreciation, even though age shall be finally adopted as the controlling factor. The objections to the straight-line method are so many that no attempt will here be made to restate them. In the case of a tie, say four years old, with a normal life of say eight years, on a light traffic road, where age and not use may determine the life of the tie, the tie is perhaps just as perfect at four

years as it was when new. This is true because decay has not yet set in, and until decay does commence there is no deterioration whatever in the tie, and yet at four years of age, under the straight-line method, the tie will be placed at 50 per cent. condition.

After decay commences deterioration is rapid, so that the straight-line method will not at any time disclose the true condition of the property.

In the case of a masonry structure, say a station building costing $250,000, it is given a normal life of 100 years. Under the straight-line method at 10 years of age it would be given a cost of reproduction less depreciation of $225,000, which is absurd. Aside from the fact that it has lost none of its "service capacity" and is just as valuable to the carrier for all purposes as when new it could not actually be reproduced for less than its cost new, and further, under any rational treatment of the question, $25,000 of depreciation is abnormally excessive, for 5.2 mills set aside each year will produce a dollar at the end of 100 years.

26. Throughout Circular No. 226 and in the engineering reports on the A., B. & A., the Norfolk Southern and the Texas Midland frequent reference is made to a "normal life," and to a "normal service life," but nowhere is there any reference to a "normal service condition" of any plant unit.

The impossible assumption that a "normal service condition" is one of absolute newness is everywhere indulged in, and each plant unit is depreciated accordingly.

A proper basis for determining a "normal service condition" of all plant units is found in Circular No. 226, with respect to ties, where it is said that "where the track has reached such a condition that the tie renewals are uniform in quantity and quality from year to year, the service condition shall be considered as 50 per cent." The condition here described is the "normal service condition" of the ties, and is a condition of 100 per cent., and not 50 per cent., for it is a condition of "full capacity for service" at a regular annual cost of maintenance. It is a condition that by regular maintenance can be continued indefinitely. It is a condition in which the ties should be maintained, and if so maintained there is no depreciation in them. If not so maintained, they are depreciated to the extent of their departure from it.

27. Circular No. 226 is based upon the impossible definition of depreciation as a loss in worth, meaning thereby a loss in monetary value of the plant units of a railroad. The true definition is a loss in service value. The Valuation Act calls for the cost of reproduction new of "each piece of property," and then the "cost of reproduction less depreciation" of same. This language does not mean, as Circular No. 226 assumes, that the second figure called for is to be an estimate of the cost of reproduction out of second-hand, used or worn materials. A railroad cannot be reproduced in that way and any assumption that it can be must be disregarded. The Act simply calls for the cost of the property out of all new material, and then the extent to which its "service capacity" has been lost through failure to apply necessary maintenance. The law must be construed in the light of the economic fact that there is a "normal service condition" for every railroad, and that the cost of reproducing any railroad is the cost of producing it in that condition. The depreciation required to be shown is the departure from this "normal service condition," and the amount of it is determined by the estimated cost of restoring the property to this "normal service condition."

A., B. & A. RAILROAD—DEPRECIATION.

SOME OF THE RESULTS OF THE APPLICATION OF CIRCULAR No. 226 TO THE A., B. & A. RAILROAD.

It is not possible to discuss the depreciation of this property made in the engineering report on much more than general lines. In the first place the carrier was not furnished with any of the condition notes of its property, and the report submitted states conclusions only, unaccompanied by any of the facts upon which they are based. The facts, therefore, cannot be discussed from the report itself, and the time elapsing between the receipt of the report and the date of this conference has been so short as to make it utterly impossible for the carrier to ascertain, on the lines of Circular No. 226, its findings of the facts with respect to its several properties.

In the case of Account No. 16, Station and Office Buildings, Circular No. 226 fixes a normal service life of 50 years for timber structures and 100 years for masonry structures. The report on the A., B. & A. with respect to this account gives as a rule the date of construction of the buildings, but the depreciation found in the several buildings does not correspond with the age. For instance, frame structures on one section, reported as all built in the year 1904, are given condition per cents. of 35, 40, 50 and 60. Age thus does not appear to have been the controlling factor. Brick structures built in 1907 are given a percentage condition of 80 and 90. The report states that "depreciation of buildings was in accordance with Memorandum No. 226, using the total service as indicated in that memorandum, except where field observations showed that this life should be reduced in particular cases." What the field observations disclosed is not reported and there is no way by which the carrier can check them.

Attention is here called to the fact that in the engineering report on the Norfolk Southern the same treatment was given to buildings as is given in the A., B. & A. report. The Norfolk Southern report says: "Buildings were depreciated in accordance with Memorandum No. 226, using the maximum service life as indicated as a basis and modifying the same as a result of observation in the field."

Attention is also called to the fact that in the engineering report on the Texas Midland a seemingly different treatment was given buildings, the Texas Midland report saying: "In establishing the service condition of buildings each was divided into a number of elements, as roof, outside walls, inside finish of outside walls, ceiling, partitions, flooring, openings and foundation. The age of the buildings was ascertained, which in general is the age of each element. Each element was carefully inspected and a service condition was established based upon the age and expected life, modified by actual observations. It was found that had mortality tables been available their exclusive use would not have been satisfactory, because of instances where buildings being permitted to rapidly deteriorate and receiving no maintenance, the mortality tables would give a much higher service condition than the facts warrant."

In the case of the A., B. & A. report on equipment there is the same absence of facts as exists in the case of buildings. The absence of facts here is found more pronounced because Circular No. 226, which the A., B. & A. report purports to follow, provides for a condition per cent. of certain parts of each locomotive and each car, based upon the age of these several parts, from which several condition per cents. a weighted average condition per cent. is ascertained and applied to the completed locomotive, completed car, etc. The A., B. & A. report furnishes none of the several condition per cents. of the parts of any equipment unit.

There is the same absence of details with respect to all properties which are depreciated.

The carrier objects to the method of determining depreciation set forth in Circular No. 226 and to the results reached by that method. If the carrier, however, was in accord with the method the entire absence of the facts ascertained in the field, and the general policy of departing at will from the rules laid down in Circular No. 226, would make it impossible for the carrier to make specific detailed exceptions to the amount of depreciation reported.

THE REPRODUCTION COSTS.

The A., B. & A. report in the general summary sheet from which is omitted a number of items of property "owned or used," gives a

Total cost of reproduction new of	$22,546,132
A total cost of reproduction less depreciation	17,960,584
Making a total depreciation of	$4,585,548

The average condition per cent. of the properties is stated to be 80.

Additional depreciation is deducted from the cost new of other properties which are either owned or used by the carrier, but which are not included in the general summary sheet; as, for instance, there is depreciation of

The Georgia Terminal Co. properties of	$72,954
The Alabama Terminal Co. properties of	87,686
The Ocilla Southern Railroad	25,696
The telegraph property of the A., B. & A. of	59,342
Office furniture of the A., B. & A. of	15,508

There are still other properties depreciated, such as over and under grade crossings built by the A., B. & A., the property leased to the Woodward Iron Co., and other properties, so that in round numbers it may be said that the engineering report deducts from the cost new of the properties owned or used by the A., B. & A. a total of $5,000,000 as depreciation. The magnitude of this amount is sufficient to require very serious consideration of the methods pursued in reaching it.

Attention is called to the fact that although this property is depreciated approximately $5,000,000 there is absolutely nothing in the report to show, or even to suggest, that the property has lost any of its "capacity for service," or that it is not properly maintained, or that it is not in condition fully and adequately to perform all the service required of it. There are one or two minor suggestions of a lack of proper maintenance in the case of certain properties, to which attention will hereafter be called, but even as to these properties there is no statement, or even suggestion, that they do not possess their "full capacity for service," except it be the wharves at Brunswick.

THE TRACK.

If we may assume that the figures shown in the report with respect to ties, rails, other track material, ballast and track-laying and surfacing, show the cost new, and the cost of reproduction less depreciation of "the track," we find the following:

	Cost New	Cost Less Depreciation	Depreciation
Ties	$999,281	$508,347	$490,934
Rails	2,717,804	2,400,600	317,204
Other track material	539,920	372,990	166,930
Ballast	381,770	278,343	103,427
Track-laying and surfacing	716,765	549,166	167,599
Total	$5,355,540	$4,109,446	$1,246,094

The track is thus found to be in 76 plus per cent. condition, and there is a total deduction for depreciation in the track of $1,246,094. According to the theory of Circular No. 226 this deduction is made because of an assumed loss of service life in the track, and yet it is a well-known fact that the life of the track is indefinite, and that no man can say what percentage, or that any percentage, of its service life is gone. To base depreciation in "track" upon an assumed loss of its service life cannot be sustained.

If it be said that the depreciation found to exist in the track does not represent a loss of service life in the "track," but only a loss of service life of its plant units, the result is equally indefensible and cannot be sustained. Upon this theory the report would mean to say that while it would cost on valuation date the sum of $5,355,540 to build the track out of all new material, that the material in it being in second-hand, used or worn condition, it has only a market value of $4,109,446 and, therefore, that this latter amount is what it would cost to reproduce the track in its existing condition, and that the difference between this amount and the cost new of the track is the depreciation in it.

As matter of fact, the "present value" or cost of reproduction of the "track" cannot be measured or determined by the second-hand monetary value of its plant units. To begin with the "track-laying and surfacing" has no sales value. In the next place, the various plant units of the track are not for sale at all and will not be sold. They have been put together in order to render a certain service, and each one of them has a value to the owner aside from its cost by reason of its combination with the others. The "present value" of the "track" cannot, therefore, be ascertained by reference to the second-hand monetary value of its plant units, but if sought to be ascertained must be ascertained by reference to the earnings of the track or what it brings to the owner in the way of proceeds from its use.

To adopt the second-hand monetary value of the various plant units of the track, separately considered, as the "present value" of the track would exclude, not only the cost of the "track-laying and surfacing," but would also exclude all costs of grading, excavations and embankments and the cost of all these items would be a total loss to the owner of the track.

The result reached under the method of Circular No. 226 entirely ignores the economic fact that it is the combination of rails, ties, track fasteners, ballast, etc., in the completed track that gives value to the owner and that the thing to be valued is the track. It ignores the economic fact that the service life of the track is indefinite, and that the cost of renewing the various plant units of the track from time to time is but a cost of maintenance of the track, chargeable to operation. It ignores the economic fact that the track cannot be continued in service with all of its plant units new at all times, and that there is and must be a "normal service condition" of the track in which it will possess its "full capacity for service," and at which it must be maintained, and that if so maintained there cannot be any depreciation or loss of worth in it.

The depreciation found in the track is based upon the impossible assumption that the "normal service condition" of the track is one of absolute newness of each and every one of its plant units, and that any departure from such newness is depreciation.

If there is real depreciation in the track of the A., B. & A. there is nothing in the engineering report to so indicate, and no statement or finding of facts by which the amount of same can be determined. There is nothing in the report to show that the track is not rendering every service required of it, and every service that an absolutely new track could render. There is no statement or suggestion that the track does not possess its "full capacity for service," or that its maintenance is neglected.

The "cost of reproduction less depreciation" of the track, under any rational engineering program of reproduction, can only be determined by the combination of three figures covering: first, the cost in place of all new plant units; second, the amount of the deferred maintenance, if any, resulting in a loss of "capacity for service," and third, the amount of the depreciation. The amount of the deferred maintenance should be deducted from the cost of the new plant units in place, and the amount of the appreciation should be added thereto. In the figures reported on the A., B. & A. an abnormal and unjustifiable amount of depreciation is found, while the appreciation, which undoubtedly exists, is entirely ignored.

TIES.

The ties on the A., B. & A. as shown in the general summary sheet average 57 per cent. condition. Circular No. 226 in dealing with ties says: "Where the track has reached such a condition that the tie renewals are uniform in quantity and quality from year to year, the service condition shall be considered as 50 per cent. The average life of ties shall be determined by a study of the carrier records of tie renewals, supplemented by a consideration of field observations."

The engineering report on the A., B. & A. advises that "The condition of the ties * * * was not such as to permit the use of 50 per cent. condition. The ties on the road east of Montezuma had been allowed to reach a subnormal condition, and those west of that point were above normal, on account of the fact that the first heavy renewal after construction was just being completed at the date of valuation. The depreciation of ties was, therefore, determined by inspection and a study of the renewal records of the company."

It is thus stated that on the line of the road east of Montezuma, the inventory being made just as a heavy renewal of ties was being completed, the ties on this part of the road were found to be above the normal condition. The report does not state the further fact that the inventory of the road east of Montezuma was made just prior to a heavy renewal of ties on that end of the road, which fact explains why the ties were there found at the time of the inventory to be in a subnormal condition. Tie renewals on this end of the road were going on before the Government field parties completed their inventory.

This situation illustrates how under Circular No. 226, the cost of reproducing a railroad, or of any of its parts, will vary with the dates that may chance to be selected for making the inventory. If the inventory is made just after renewals and replacements have been made, the cost of reproduction less depreciation will be much greater than if made just prior to such renewals and replacement.

The placing of new ties in a track is nothing but ordinary maintenance of the track. Neither the value of the track, nor the cost to reproduce it, can be affected by the age of the ties so long as they are in serviceable condition. It is an everyday experience for a section gang to step aside to allow a passenger train on the very best of railroads to pass by at a high rate of speed, and immediately after it has gone by to take out one or more of the ties, over which the train has just passed, and replace them with new ties. Neither the service, the value, nor the cost of the track was affected in the slightest by the fact that these ties were to come out at the time the train passed over them.

There is no justification for the 50 per cent. condition of ties when tie renewals are normal as is proposed in Circular No. 226. In the case of the A., B. & A. the average condition of the ties was found to be a little in excess of this 50 per cent. condition, but it could just as well have been found to be less than the 50 per cent. condition, and would have been so found had the lines west of Montezuma been inventoried just prior to the heavy renewal of ties there made, as was the case on the line east of Montezuma.

The method of determining depreciation with respect to ties, under Circular No. 226, is nothing more than a method for determining the second-hand monetary value of the ties.

To say that 1000 ties will cost new 50 cents each, and that they are in 50 per cent. condition, is the same thing as to say that the second-hand monetary value of the 1000 ties is 25 cents each. This is, of course, absurd for second-hand ties have no monetary value save perhaps for firewood.

The A., B. & A. report on ties means to say that while it would cost $999,281 to reproduce these ties new, that they can be reproduced in their present condition for $508,347. This is manifestly an impossibility, for the second-hand ties for the purpose could not be obtained, but even if they could be obtained, to assume that the track would be reproduced with them would not be to assume a rational engineering program.

The engineering report on the A., B. & A. allows three years for the construction of valuation sections 11 and 12. It is manifest that by the time these sections were constructed, under this reproduction program, that the ties therein would not be in a condition of newness, and yet the track thus constructed would be an absolutely new track, and under Circular No. 226 would actually depreciate in the process of being constructed new.

RAILS.

The engineering report assumes the total service life for new rail west of Fitzgerald to be 18 years, and east of Fitzgerald to be 25 years, and the rail is depreciated accordingly. Manifestly the depreciation will be greater or less, as the inventory may chance to be made before or after rail renewals. In the meantime, despite these varying valuations, the rail will be maintained at its "full capacity for service," the track will continue to give all the service, and to have all the value it was ever designed to have; and, despite deductions for depreciation and the renewals constantly overcoming same, the investment account of the carrier in rails will remain the same. The matter of rail renewals is nothing more than a maintenance expense of the track. In the case of the A., B. & A. rails are given an average per cent. condition in the summary sheet of 88.

In the engineering report on the Norfolk Southern it is said that "the life of rail between new and relay," was found to vary "from seven to 30 years," and a "composite average life, in such service, was therefore assumed at 16 years," and the rail was depreciated accordingly. The life of relay rail was found to vary from five to 28 years and "an average life was established of 19 years, on which depreciation was based." Relay rail on the A., B. & A. was given a normal life of 50 years.

In the Texas Midland engineering report a service life of 25 years was assumed for new rail in main track and 50 years for relay rail. The 25 years fixed as the life of new rail in the main track was purely an arbitrary figure. There were absolutely no records of the railroad by which the figure could be justified. The fixing of this arbitrary figure of 25 years on this road resulted in "salvage value" being substantially all the value allowed this railroad for its new rail, because the most of its rail was 23 years old on the date of valuation. In this connection, it was shown at the conference on the Texas Midland report, that there was no wear discoverable by actual measurement in this 23 year old rail, and there had never been any breakage in it, and that it was in all respects as good as new rail.

The life of rail necessarily depends not upon its age, but upon the extent of the traffic passing over it, and the character of maintenance of the roadbed. Where there is great density of traffic the life of rail is much shorter than where there is light traffic, and to use the record of rail renewals on each railroad for the purpose of determining the service life of its rail, results in giving to the less prosperous railroad, because of its light traffic, a higher cost of reproduction less depreciation for its rail than is given to the more prosperous road where traffic is heavy. The inconsistency of the figures reached in this way illustrates the absurdity of the method. The cost of rail renewals is a cost of track maintenance. It is a simple charge to operation and does not affect capital investment. The cost of maintaining the track of a railroad, where traffic is dense, is greater than the cost of maintaining the track of a light-traffic road. This difference in cost of maintenance illustrates nothing as to the cost of reproducing

the several tracks, and so long as a proper "service condition" is maintained, the matter of the cost of such maintenance is irrelevant to any determination of either the value of or the cost to reproduce the track.

BALLAST.

Circular No 226 provides that "Ballast shall be depreciated according to the general rules," and also provides that "No allowance shall be made for appreciation or depreciation as such to excavation and embankment pay quantities of grading." In accordance with this rule ballast on the A., B. & A. is given a condition per cent. of 73, and there is a deduction for depreciation of $103,427. Ballast is renewed just as ties and rails are, and the cost of such renewals is a mere maintenance cost of the track. Such cost reflects nothing as to the value, or the cost to reproduce the track. Ballast becomes compacted and in that way appreciates because of greater stability, but the compacting requires new ballast. Ballast may also waste to some extent and for that reason has to be replaced. The cost of reproducing ballast on any railroad under the method of Circular No. 226 will depend entirely on whether the inventory is made before or after renewals of ballast have been made. In the meantime, despite varying valuations, the track continues at its "full capacity for service," and there is no change in the investment account of the carrier for ballast.

OTHER TRACK MATERIAL.

These properties on the A., B. & A. are depreciated $166,930. and they are found to be in 70 per cent. condition. This result was reached by arbitrarily assuming a total service life for frogs and switches at 16 years, of switch stands at 20 years, of derails 50 years, and of crossing frogs 12 years. The renewals of these properties like rail, ties and ballast is but a simple cost of maintaining the track, and the value of the track for all the uses and purposes intended cannot be decreased so long as it is maintained at its "full capacity for service."

TRACK-LAYING AND SURFACING.

Circular No. 226 provides that this item "shall be depreciated with the materials composing the track" and that the depreciation shall be determined "on the basis of the depreciation weighted according to the labor costs assignable to the materials of the several accounts."

It is difficult to find any theory upon which the depreciation in this item of cost can be even plausibly maintained. All labor costs lost by reason of the deterioration and removal of plant units, is, of necessity, restored by new labor costs in putting the new plant units in place. The additional labor costs thus incurred are a charge to operation, and as they do not go to the credit of capital there certainly should be no deduction made from capital for the labor costs which they replace.

BRIDGES, TRESTLES AND CULVERTS.

This item is reported in the summary sheet as follows:

Cost of reproduction new	$2,370,728
Cost of reproduction less depreciation	1,980,705
Total depreciation	$390,023

The average per cent. condition is 84.

None of the details as to the bridges showing how the depreciation is determined appear. The report says that these items "were depreciated in accordance with Memorandum No. 226." This memorandum provides for depreciation solely by age.

It is manifest that structures of this character, whether old or new, have no market value. A bridge in place represents a cost of material, a cost of labor in putting together, a cost of labor in excavation and supervision, an engineering cost and possibly other costs. The structure when finally completed is for service, and aside from such scrap or salvage value as it may have has no other than a service value. A bridge must not only be in place in order to allow the road to operate its trains, but it must be maintained in a safe and proper condition for service. Its service life may be prolonged indefinitely by a continual replacement of its parts, and so long as these parts are replaced as needed, and the "full capacity for service" of the bridge maintained, there is no loss in its service life, and, barring the intervention of obsolescence and inadequacy, its full service value is continued indefinitely.

There is nothing in the engineering report to indicate that the A., B. & A. bridges have lost any of their "capacity for service;" that trains have to be "slowed down" by reason of their condition, or that there is any deferred maintenance chargeable against them. The report simply purports to say that because the bridges are of a certain age they must of necessity be depreciated, regardless of the fact of whether or not they are actually depreciated.

The report means to say that the bridges on the A., B. & A. can be reproduced by using second-hand material at a cost of $390,023 less than it would cost to construct them out of new material. This is to assume a method of reproduction never practiced and that cannot be justified. These bridges cannot be reproduced except at their cost new, and there can be no depreciation in them other than is measured by the cost, if any, necessary to restore them to their "capacity for service" on the date of valuation.

EQUIPMENT.

Equipment is given a total reproduction cost new of $4,690,424 and a cost of reproduction less depreciation of $2,862,130, which makes a total of $1,828,294 deducted for depreciation in equipment. Equipment is given an average condition of 61 per cent.

It clearly appears in the engineering report that this result on equipment was arrived at by "taking account of obsolescence of the entire unit," and "by limiting the life of all parts to the period which would elapse before the unit was expected to go out of service." It was never supposed by the carriers until this report that any obsolescence and inadequacy, outside of that actually existing on valuation date, would be taken into account. This report, however, seems to take into account an estimated future obsolescence and inadequacy which cannot be justified. How much of the large amount of depreciation found is due to this estimated future obsolescence and inadequacy, and how much to the actual use of the property is not shown.

The report as to freight train cars shows one series of 128 cars costing $682 each new as being in 43 per cent. condition, and another series of 993 freight train cars costing $772 each as being in 47 per cent. condition. Some individual cars are reported as in 33, 39 and 42 per cent. condition.

It appears in the text of the report that "the rolling equipment owned and operated is adequate for the requirements of the road except that the number of freight cars is slightly less than needed. The maintenance of the freight cars is generally below normal."

It is rather an interesting fact that while the freight cars referred to as being in a below normal condition were depreciated from $300 to $400 each, that since the inventory was made these freight cars have been through the shop, and at a cost to operation of $150 each, have been placed in first class condition, and have for the purposes of the carrier all the value of new cars.

This experience shows first that the method of Circular No. 226 for determining depreciation produces an abnormally high depreciation, and one that cannot be accepted. It also clearly points out that the whole theory of Circular No. 226 for determining depreciation is wrong. The A., B. & A. report takes from $300 to $400 from the cost new of each of these several freight cars as depreciation, which amount under any theory is excessive, and if the report stands that much of value to the A., B. & A. R. R. is wiped out and destroyed. Even the $150 that has been expended by the railroad for repairing and renewing each of these cars, and thereby overcoming the deterioration, cannot, under the Commission's regulations, be used to increase its capital account, or to offset in part the deduction of from $300 to $400 that has been made.

The text of the report shows that the rolling equipment as owned and operated "is adequate for the requirements of the road" except that, in the opinion of the report, the road needs a few more freight cars. If the equipment as "owned and operated" is "adequate" for all the requirements of the road, why is it not worth to the road all that it cost? The equipment was bought to use not to sell, and if the present equipment renders all the service to the road that new equipment could render there has been no loss in "capacity for service," and no loss to the carrier in its investment for all the uses and purposes it was intended to serve.

When the report says, as it does, that there are 286 gondola cars that cost new $1022 each, or a total of $292,292 and that they are in 53 per cent. condition, and that their cost of reproduction less depreciation is $154,915, it means to say that this latter amount is all that these cars would sell for in the market in their existing second-hand condition. If we assume that this is a correct conclusion, the same cannot be a test of the depreciation involved under the law, because these cars are not for sale. If the carrier sold them it would be compelled to buy new cars of like type at cost new, and the new cars would soon be in the present condition of the old cars, and in the meantime would render no better service than the old cars. These cars were bought to use, to render service and not to sell, and so far as the purposes of the carrier are concerned, so long as they maintain their "full capacity for service" they have to him all the value of new cars, and the value of his "investment" in them is preserved.

Ninety-one locomotives are reported at an average of 75 per cent. condition. There is no statement that these locomotives are not fully and adequately maintained. There is no statement that they are not rendering all the service required of them. There is no statement that the expense of maintaining them is abnormally high. There is nothing furnished except the opinion that while these 91 locomotives cost new $1,263,647 they could not be now sold in the market in their second-hand condition for more than $942,793, or 75 per cent. of their cost new, and, therefore, that they have depreciated to the extent of 25 per cent. As frequently pointed out this is not the measure of depreciation.

A study of the condition per cent. allowed the locomotives of the A., B. & A. shows that they were assumed to be retired by obsolescence in about 25 years, and were depreciated on the straight-line method at 3½ to 4 per cent. per annum until they reached about 12 years of age. The straight-line method, however, was generally departed from after that age. It is interesting to note that a locomotive built in 1885 and, therefore, 29 years old on the date of valuation is given a per cent. condition of 47, whereas under the method of treatment accorded to the younger locomotives it would have only scrap value at that age. The fact that a locomotive can be maintained indefinitely is seemingly recognized after it reaches a certain age, but up to this age, such fact is not admitted and the straight-line method is used. The general affect of the application of Circular No. 226 to the rolling equipment of the A., B. & A. appears to be to reduce all the equipment by the straight-line method to 50 or 60 per cent. as quickly as possible, and then to assume that in such condition it can be maintained.

In the engineering report on the Norfolk Southern, while no admission is made that future obsolescence has been resorted to in order to determine the life of equipment, an examination of the figures shows that substantially the same thing was done on this road in this regard, that the A., B. & A. report admits was done on that road.

In the Norfolk Southern report on equipment a remarkable uniformity is noted in the column "per cent of cost new." A 1913 engine is marked at 96 per cent.; 1911 engines are marked 90 per cent.; 1908 engines are marked 80 per cent.; a 1901 engine is marked 55 per cent.; a 1897 engine is marked 40 per cent.; a 1896 engine is marked 37 per cent,; a 1985 engine is marked 33 per cent.

Various engines between these dates show a uniform basis of depreciation of about three and one-half per cent. a year on an assumed ending of service life by reason of obsolescence or inadequacy in about 27 years. In this report, however, as in the case of the A., B. & A. this arbitrary method of determining depreciation is departed from when a locomotive reaches a sufficient age to demonstrate its absurdity. If the arbitrary method employed during the first years of the life of locomotives was continued to the end, a locomotive built in 1887 would have practically nothing but scrap value, and yet this report shows a locomotive built in 1880 in 53 per cent. condition, and this notwithstanding the fact that it was 34 years old on the date of valuation. Another locomotive built in 1889 is given 85 per cent. condition, and one built in 1881 is given 14 per cent. condition. The theory upon which these locomotives have been depreciated appears to be to use the straight-line method upon an assumed normal life, so as to get the cost of reproduction less depreciation down to about 50 per cent. as quickly as possible. Once this condition per cent. is reached the straight-line method is departed from, and the fact is then recognized that the service life of the locomotive is indefinite. Such methods of determining depreciation appear to be entirely arbitrary and without regard to any rule. They cannot be justified.

EQUIPMENT DEPRECIATION OR REPLACEMENT RESERVES.

In the consolidated general balance sheet of the A., B. & A. R. R. and its subsidiary corporations as shown in the accounting report, there appears as a liability under the heading of "Unadjusted credits" the following item:

"Accrued depreciation—equipment $510,681.12."

We have seen that in the engineering report there has been deducted as depreciation, from the cost new of the equipment, the total of all the so-called "accrued depreciation" amounting to $1,828,294. It would seem that the road having already had all the "accrued depreciation" in its equipment deducted as of the date of valuation, it cannot be held for a future liability for this same "accrued depreciation" in the amount of $510,681.15. In other words, the deduction of the total "accrued depreciation" existing on valuation date and the charge of a "liability" for same would not both seem to be correct. This suggestion may present only an accounting problem, but, be that as it may, some readjustment of the accounts seems necessary.

The error of the methods of depreciation prescribed by Circular No. 226 are illustrated by the accounting situation. The A., B. & A. R. R. sets up a depreciation, or replacement allowance for equipment, of four per cent. On a locomotive costing $10,000 this would amount to only $400 per annum. This amount is, of course, entirely inadequate to cover the cost of maintenance of such locomotive in the way of repairs to it, and renewals of its parts. The amount spent on A., B. & A. locomotives each year probably averages around $2000. The depreciation reserve is accumulated as against the day of the possible retirement of locomotives from service, and has no relation to the cost of renewals of parts, which parts are depreciated under Circular No. 226.

The total amount accumulated by the A., B. & A. on June 30, 1914, for replacement purposes is probably amply sufficient, as it is only when equipment is retired that a charge is made against such fund.

GENERAL EXPENDITURES ACCOUNTS Nos. 71–77.

The report makes an allowance for these several expenditures in cost of reproduction new amounting to $1,633,979, and then depreciates them to a condition of 80 per cent., and makes the allowance for them in the cost of reproduction less depreciation $1,307,184. There is deducted for depreciation in these general expenditures the sum of $326,795.

The largest item in these general expenditures is that of "interest during construction." This is stated in the cost of reproduction new column to be $1,215,737, and in the cost of reproduction less depreciation to be $972,590. There is thus deducted for depreciation in interest the sum of $243,147. It will be noted that the total interest finally allowed in reproduction, $972,590, is less than five per cent. of the total reproduction new less the interest shown on the summary sheet.

It is difficult to understand upon what theory of reproduction interest and other overheads can be depreciated.

If we adopt the theory of ascertaining the loss in monetary value of the various plant units by reason of their second-hand condition as the measure of the depreciation, there would still be no justification for depreciating interest and the other overheads, for the road under any rational engineering program would be reproduced out of new material.

There could be no justification for depreciating these items unless we are to assume a reproduction program calling only for second-hand material, thereby requiring less money for construction. To adopt such a theory of reproduction would be contrary to all railroad experience, and would not be to adopt a rational engineering program.

It would seem that the reproduction program of the A., B. & A., whatever the theory of depreciation adopted, would have to assume the purchase and putting in place of new material, for the railroad was built that way, would be reproduced in that way if it was to be again constructed, for all railroads are built in that way. A reproduction program of this character would require interest during construction, and all other overhead charges to be computed upon the basis of a reproduction new. There is not, nor can there be, any loss of or depreciation in interest due to deterioration, or depreciation of the physical properties, because the property as a whole is a continuing property, and all the overhead charges and interest incurred in its construction remain in it, and would have to be again incurred if the property was reproduced.

WHARVES AND DOCKS—ACCOUNT No. 23.

These properties are found at Brunswick, Ga., and are given a cost of reproduction new of $678,378, and a cost of reproduction less depreciation of $461,616. They are found to be in 68 per cent. condition. The accounting report shows, page 8, that the improvement of the Brunswick Terminals cost $1,195,050.38.

In the valuation sheets supporting the summary quite a number of items composing these properties are given a condition of zero. Others are given a condition of 22, 25, 30, 50, 78, 80 and some of them 90 per cent. The carrier has actually only maintained such of the "slips" as its business has required.

The item of "dredging" is given a cost of reproduction new of $141,853, and a cost of reproduction less depreciation of $81,565. Dredging is found to be in 57.5 per cent. condition.

It is said in the text of the engineering report that "The depreciation assigned to dredging in this account is the ratio between the amount of excavation originally made and the amount found at the time of inventory, so that the difference between the reproduction cost and the reproduction cost less depreciation represents the expenditures, at the unit reproduction price, that it would be necessary to expend in order to restore the original depth of water. The structures were depreciated in the same manner as bridges."

In the matter of dredging there is thus seemingly recognized the principle of deferred maintenance as the measure of depreciation, and it is difficult to understand why, if this principle is applicable to dredging, it is not applicable to all the property.

In the matter of the "dredging" the text of the engineering report says: "The location of the terminal in a bend of the ship channel is such that the slips and basin are filled rapidly by the silt-bearing river. Six years after the construction of the plant several hundred thousand yards of material were dredged from the slips in order to restore the original depth, and a creosoted timber breakwater was constructed to deflect the silt-bearing currents. This plan has not proven efficacious and at the time of inventory there was much less depth of water in the slips than was originally provided." It will be found that at other ports such as Savannah, Jacksonville and Mobile dredging in front of wharves has to be done every year or two, the same as at Brunswick. This is a normal condition. The cost of the dredging is a pure maintenance cost, and in practice is so treated. Under these circumstances there can be no justification for deducting as depreciation the cost of needed dredging on the date of valuation, except to the extent that same may have been improperly or unduly deferred.

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